

PATENT COOPERATION TREATY

From the INTERNATIONAL BUREAU

PCT

NOTIFICATION OF ELECTION
 (PCT Rule 61.2)

Date of mailing (day/month/year) 08 November 2000 (08.11.00)	To: Commissioner US Department of Commerce United States Patent and Trademark Office, PCT 2011 South Clark Place Room CP2/5C24 Arlington, VA 22202 ETATS-UNIS D'AMERIQUE in its capacity as elected Office
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International application No. PCT/GB00/01129	Applicant's or agent's file reference N00/0272/PCT
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International filing date (day/month/year) 24 March 2000 (24.03.00)	Priority date (day/month/year) 31 March 1999 (31.03.99)
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Applicant SULLIVAN, John, Anthony
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1. The designated Office is hereby notified of its election made:

in the demand filed with the International Preliminary Examining Authority on:

18 September 2000 (18.09.00)

in a notice effecting later election filed with the International Bureau on:

2. The election was

was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

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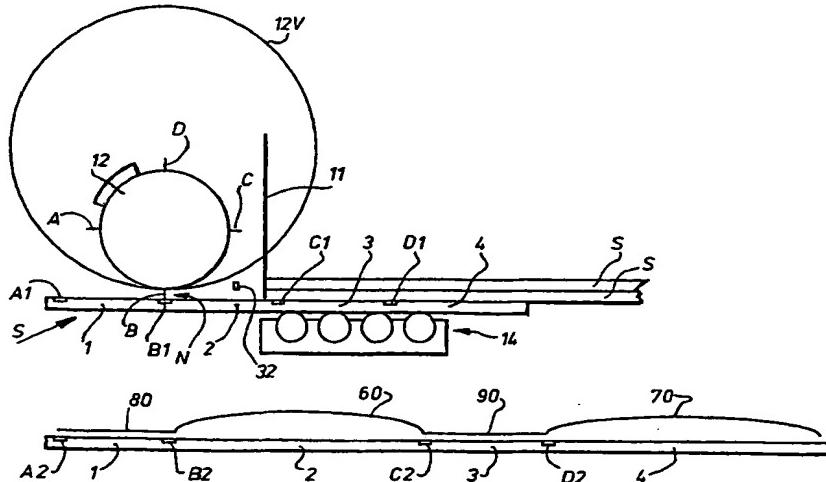
- With international search report.
- With amended claims.

(88) Date of publication of the international search report:
15 February 2001

Date of publication of the amended claims: 12 April 2001

[Continued on next page]

(54) Title: SHEET MATERIAL PROCESSING



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(57) Abstract: There is disclosed apparatus for feeding sheet material (S) sequentially on demand to the take-up mechanism (12) of processing machinery, the apparatus comprising a feed table having a gate (11) and upon which the sheets (S) may be stacked against the gate (11) which allows only the lowermost sheet to pass therebeneath, a bed of rollers within the surface of the table (14) which may be rotatably driven to advance the lowermost sheet beneath the gate (11) to the take-up mechanism (12) when forward drive to the rollers is arrested and means to allow the rollers to free-wheel once the lowermost sheet is being advanced thereover by said take-up mechanism (12) and means for restraining freewheeling over run of the rollers. Also disclosed is the processing of sheets which are longer in length than the circumference of a tool-carrying roll set (12) used to process the sheet (S), the difference being accommodated by transferring sheet feed through the nip (N) between the roll set (12) and a separate servo-controlled drive (14) upstream of the nip (N).

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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

AMENDED CLAIMS

[received by the International Bureau on 21 November 2000 (21.11.00);
original claims 1-51 amended (10 pages)]

1. Apparatus for processing sheet material comprising;
a set of rotatable rolls provided with one or more sheet-processing tools for engagement with the sheet material in the nip zone between the roll set;
a first drive for rotating the roll set;
a second drive upstream of the nip zone for effecting feed of the sheet material;
and
means operable to co-ordinate operation of the second drive with rotation of the roll set in such a way that sheet feed through the nip zone is effected for part of the time by the roll set and for part of the time by the second drive, the second drive imparting feed to the sheet material through drive transmitting means which freewheel while in engagement with the roll driven sheet.
2. Apparatus for processing sheet material comprising;
a set of rotatable rolls provided with one or more sheet-processing tools for engagement with the sheet material in the nip zone between the roll set;
a first drive for rotating the roll set;
a second drive upstream of the nip zone for effecting feed of the sheet material;
and
means operable to co-ordinate operation of the second drive with rotation of the roll set in such a way that sheet feed through the nip zone is effected for part of the time by the roll set and for part of the time by the second drive.
3. Apparatus as claimed in Claim 1 or 2 in which the feed of sheet material through the nip zone is effected by the roll set at least while there is tool-sheet engagement.

4. Apparatus as claimed in Claim 1, 2 or 3 in which feed of sheet material through the nip zone is effected by the second drive at least for part (preferably a major part) of the time that there is no tool-sheet engagement.
5. Apparatus as claimed in any one of Claims 1 to 4 in which the roll set is provided with two or more circumferentially spaced sheet-processing tools.
6. Apparatus as claimed in Claim 5 in which the roll set is provided with a traction section trailing one of the tools for imparting feed motion to the sheet material subsequent to disengagement between said one tool and the sheet.
7. Apparatus as claimed in any one of Claims 1 to 6 in which the second drive is a variable speed drive operable to vary the speed profile of sheet material feed through the nip zone.
8. Apparatus as claimed in Claim 1 or any one of Claims 3 to 7 when dependent on Claim 7 including means for braking or damping freewheeling of said drive transmitting means so that freewheeling is arrested substantially immediately upon disengagement of the sheet from the drive transmitting means.
9. Apparatus as claimed in Claim 1 or 8 in which the drive transmitting means comprises rollers which engage the sheet material.
10. Apparatus as claimed in Claim 1 or 8 in which the drive transmitting means includes one or more endless conveyor belts which engage the sheet material.

11. Apparatus as claimed in any one of Claims 1, 8, 9 and 10 in which, during roll driven sheet material feed, the second drive is arrested or operates at a reduced drive speed compared with the roll drive speed.
12. Apparatus as claimed in any one of Claims 1 and 8 to 10 in which, during roll driven sheet material feed, the second drive is arrested or operates at a reduced drive speed compared with the roll drive speed and in which said drive transmitting means operates automatically in freewheel mode when engaged with sheet material being fed at a speed exceeding that of the second drive.
13. Apparatus as claimed in any one of Claims 1 to 12 in which, immediately prior to transfer of sheet material feed from the second drive to the roll set or *vice versa*, the second drive is programmed to run at a speed which is reduced compared with the roll speed.
14. Apparatus as claimed in any one of Claims 1 to 12 in which, during the interval leading up to transfer of sheet material feed from the second drive to the roll set or *vice versa*, the second drive operates in a mode in which its speed exceeds the roll speed and is then adjusted to a lower speed.
15. Apparatus as claimed in Claim 14 in which said lower speed is less than the roll speed.
16. Apparatus as claimed in any one of Claims 1 to 15 in which the co-ordinating means is programmable in dependence upon the configuration of tool operations to be performed on the sheet.

17. Apparatus as claimed in any one of Claims 1 to 16 in which the sheet material is fed to the roll set as discrete blanks.

18. Apparatus as claimed in any one of Claims 1 to 16 in which the sheet material is fed to the roll set as a continuous web of material.

19. Apparatus for feeding sheet material sequentially on demand to take up mechanism of sheet processing machinery, said apparatus comprising a feed table having a gate and upon which the sheets may be stacked against the gate which allows only the lowermost sheet to pass therebeneath, a bed of rollers within the surface of the table which may be rotatably driven to advance the lowermost sheet beneath the gate to the take-up mechanism, means to allow the rollers to free-wheel once the lowermost sheet is being advanced thereover by said take-up mechanism, and means for restraining freewheeling roller feed of the next lowermost sheet after the sheet being fed has passed under the gate.

20. Apparatus for feeding sheet material sequentially on demand to take up mechanism of sheet processing machinery, said apparatus comprising a feed table having a gate and upon which the sheets may be stacked against the gate which allows only the lowermost sheet to pass therebeneath, a bed of rollers within the surface of the table which may be rotatably driven to advance the lowermost sheet beneath the gate to the take-up mechanism, means to allow the rollers to free-wheel once the lowermost sheet is being advanced thereover by said take-up mechanism, and means for restraining freewheeling roller feed of the next lowermost sheet after the sheet being fed has cleared the rollers.

21. Apparatus for feeding sheet material sequentially on demand to take up mechanism of sheet processing machinery, said apparatus comprising a feed

surface having a gate and upon which the sheets may be stacked against the gate which allows only the lowermost sheet to pass therebeneath, conveyor means associated with the feed surface for advancing the lowermost sheet beneath the gate to the take-up mechanism, means to allow the conveyor means to free-wheel once the lowermost sheet is being advanced thereover by said take-up mechanism, and means for restraining freewheeling feed of the next lowermost sheet after the sheet being fed has cleared the conveyor means.

22. Apparatus as claimed in Claim 21 in which the conveyor means comprises roller means which directly engage with the lowermost sheet.
23. Apparatus as claimed in Claim 21 in which the conveyor means comprises roller means which contact the lowermost sheet indirectly through one or more conveyor belts entrained around the roller means.
24. Apparatus as claimed in any one of Claims 19 to 23 in which the restraining means comprises brake means acting on the rollers or conveyor means.
25. Apparatus as claimed in any one of Claims 19 to 23 in which the restraining means comprises vacuum suction means located upstream of the rollers or conveyor means to hold the next lowermost sheet against the action of the freewheeling rollers after the sheet being fed has passed under the gate.
26. Apparatus according to any one of Claims 19 to 25 in which the take-up mechanism comprises a tool-carrying roll set.
27. Apparatus according to any one of Claims 19 to 26 in which the rollers or conveyor means are fitted with sprag clutches and advance the sheet being fed at

substantially the same speed as, or a slower speed than that of, the take-up mechanism.

28. Apparatus according to any one of Claims 19 to 28 in which the rollers or conveyor means are driven by a servo electric motor which alternately drives the rollers or conveyor means forwardly and stops, the timing of the motor being controlled by the processing machinery.

29. Apparatus according to any one of Claims 19 to 28 wherein vacuum suction is applied from beneath the rollers or conveyor means to pull the lowermost sheet downwardly against the rollers.

30. Apparatus according to Claim 19 or 20 wherein the rollers are rotatably interconnected by timing drive belt means, one of which rollers is driven by a further timing drive belt.

31. Apparatus according to Claim 30 wherein said further drive belt is toothed.

32. Apparatus for feeding sheet material sequentially on demand to take-up mechanism of sheet processing machinery, said apparatus comprising a feed table having a gate and upon which sheets may be stacked against the gate which allows only the lowermost sheet to pass therebeneath, drive transmitting means driven by a servo-motor to advance the lowermost sheet beneath the gate to the take-up mechanism, a sensing means between the gate and the take-up mechanism to detect the passage of a datum position of the sheet, a microprocessor which receives data indicating the position of the take-up mechanism and from the sensing means and programmed to control the servo-motor to ensure that the sheet presents itself to the take-up mechanism at the correct instant.

33. Apparatus for feeding sheet material sequentially on demand to take-up mechanism of sheet processing machinery, said apparatus comprising a servo-drive motor, means for transmitting drive from the servo-drive motor to the sheet material to advance the sheet material to the take-up mechanism, sensing means for detecting the passage of a datum position of the sheet material as the latter advances towards the take-up mechanism, and a microprocessor which receives data indicating the position of the take-up mechanism and from the sensing means and programmed to control the servo-drive motor to secure registration between the sheet material and the take-up mechanism, the drive transmitting means being operable automatically in a freewheel mode while in engagement with sheet material travelling at a speed greater than the speed of the servo-drive motor.
34. Apparatus according to claim 32 or 33 wherein the microprocessor is programmed to ensure that the leading edge of the sheet presents itself to the take-up mechanism at a desired speed.
35. Apparatus according to claim 34 wherein the desired speed is slightly less than the speed at which the take-up mechanism forwards the sheet.
36. Apparatus according to claim 34 wherein the desired speed is zero.
37. Apparatus according to any one of Claims 32 to 36 wherein the take-up mechanism comprises a pair of take-up rolls.
38. Apparatus according to any one of Claims 32 to 36 wherein the take-up mechanism comprises gripper bars.

39. Apparatus according to any one of Claims 1, 8 to 10 and 32 to 38 wherein the means driven by the second drive or the servo-motor comprises a bed of rollers within the surface of the table which are rotatably driven to advance the lowermost sheet beneath the gate to the take-up mechanism when forward drive to the rollers is arrested and means to allow the rollers to free-wheel once the lowermost sheet is being advanced thereover by the roll set or take-up mechanism.
40. A method of treating sheet material by passage through the nip between a set of rotatable rolls provided with a least one sheet treatment tool, comprising: driving the sheet material through the nip for part of the time by means of the rolls and for part of the time by a separate servo-controlled drive which acts on the sheet material at a location upstream of the nip, the servo-controlled drive being transmitted to the sheet through roller means or conveyor belt means capable of freewheeling while in contact with the roll set-driven sheet material.
41. A method of treating sheet material by passage through the nip between a set of rotatable rolls provided with a least one sheet treatment tool, comprising: driving the sheet material through the nip for part of the time by means of the rolls and for part of the time by a separate servo-controlled drive which acts on the sheet material at a location upstream of the nip.
42. A method as claimed in Claim 40 or 41 including supplying the sheet material to the nip in the form of discrete sheets.
43. A method as claimed in Claim 40 or 41 including supplying the sheet material to the nip in the form of a continuous web.

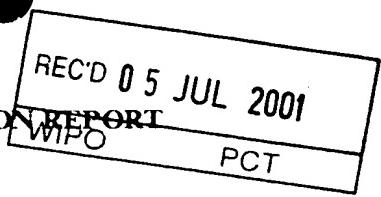
44. A method as claimed in Claim 43 in which the continuous web is severed into discrete sheets by the rolls.
45. A method as claimed in Claim 42 or 44 in which the length of the discrete sheets exceeds the circumference of the tool-carrying roll.
46. A method as claimed in any one of Claims 40 to 45 in which, between successive tool-sheet operations on a given sheet or section of sheet material, the servo-controlled drive feeds a section of sheet through the nip of a length which differs from the circumferential spacing on the roll between the tool(s) effecting such operations.
47. A method as claimed in Claim 40 or any one of Claims 42 to 46 when dependent on Claim 40 including applying a braking force to the freewheeling roller means or conveyor belt means to prevent over run thereof.
48. A method as claimed in any one of Claims 40 to 47 including sensing the sheet position by detection of a datum position on the sheet and controlling sheet feed by the servo-controlled drive to secure at least initial registration between the sheet and the roll set tooling.
49. A method as claimed in any one of Claims 40 to 47 including sensing the sheet position by detection of a plurality of lengthwise spaced datum positions on the sheet and controlling sheet feed by the servo-controlled drive to secure and maintain registration between the sheet and the roll set tooling.

50. A method as claimed in any one of Claims 40 to 49 including feeding a terminal trailing section of the sheet through the nip by means of a non-tool-carrying section of the roll set.
51. Sheet treated by the method claimed in any one of Claims 40 to 50.

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT



(PCT Article 36 and Rule 70)

Applicant's or agent's file reference N00/0272/PCT	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. PCT/ GB 00/ 01129	International filing date (day/month/year) 24/03/2000	Priority date (day/month/year) 31/03/1999
International Patent Classification (IPC) or national classification and IPC B65H5/34		
Applicant SULLIVAN, John Anthony		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 9 sheets, including this cover sheet.

This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consists of a total of 12 sheets.

3. This report contains indications relating to the following items:

- I Basis of the report
- II Priority
- III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV Lack of unity of invention
- V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI Certain documents cited
- VII Certain defects in the international application
- VIII Certain observations on the international application

**CORRECTED
VERSION**

Date of submission of the demand 18/09/2000	Date of completion of this report 28. 6. 01]
Name and mailing address of the IPEA/ European Patent Office, Gitschner Str. 103 D-10969 Berlin - Germany Tel.: (+49-30) 25901-0 Fax: (+49-30) 25901-840	Authorized officer David. P. +49 30 25901 537



**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/GB00/01129

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, pages:

1-20 as originally filed

Claims, No.:

1-16,27 (part), 28-51	as received on	04/12/2000 with letter of	14/11/2000
17-26,27 (part)	with telefax of	15/06/2001	

Drawings, sheets:

1/5-5/5 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- the language of publication of the international application (under Rule 48.3(b)).
- the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- contained in the international application in written form.
- filed together with the international application in computer readable form.
- furnished subsequently to this Authority in written form.
- furnished subsequently to this Authority in computer readable form.
- The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/GB00/01129

- the description, pages:
 the claims, Nos.:
 the drawings, sheets:
5. This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):
(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)
6. Additional observations, if necessary:

IV. Lack of unity of invention

1. In response to the invitation to restrict or pay additional fees the applicant has:
- restricted the claims.
 paid additional fees.
 paid additional fees under protest.
 neither restricted nor paid additional fees.
2. This Authority found that the requirement of unity of invention is not complied and chose, according to Rule 68.1, not to invite the applicant to restrict or pay additional fees.
3. This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2 and 13.3 is
- complied with.
 not complied with for the following reasons:
4. Consequently, the following parts of the international application were the subject of international preliminary examination in establishing this report:
- all parts.
 the parts relating to claims Nos. 1, 3-31, 40, 42-47, 50,51.

**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability;
citations and explanations supporting such statement**

1. Statement

Novelty (N) Yes: Claims 1, 3- 31, 40, 42-47, 50, 51
 No: Claims

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/GB00/01129

Inventive step (IS) Yes: Claims
No: Claims 1, 3- 31, 40, 42-47, 50, 51

Industrial applicability (IA) Yes: Claims 1, 3- 31, 40, 42-47, 50, 51
No: Claims

2. Citations and explanations
see separate sheet

VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:
see separate sheet

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/GB00/01129

Re Item IV

Lack of unity of invention

The international preliminary examination report has been established on the following group of claims: 1, 3-7 (when dependent on claim 1), 8-12, 13-18 (when dependent on claim 1), 19-31, 40, 42-46 (when dependent on claim 40), 47, 50-51 (when dependent on claim 40).

Re Item V

Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

Reference is made to the following documents:

D1: GB 1 385 053 A,

D2: US 3 907 278 A,

D3 : GB 756 357 A,

D4 : US 4 648 587 A,

D5 : EP 0 379 306 A,

D6 : WO 96 29269 A.

D1, which is considered to represent the most relevant state of the art for claim 1 discloses (cf. page 1, line 1 to page 4, line 34; Fig. 1-4) an apparatus for processing sheet material (**continuous or not continuous, see page 4, lines 30-34**) comprising;

a set of rotatable rolls 22, 23 provided with sheet-processing tools for engagement with the sheet material in the nip zone between the roll set;

a first drive 61 for rotating the roll set;

a second drive 60 upstream of the nip zone for effecting feed of the sheet material;

and

means 62-68 operable to co-ordinate operation of the second drive 60 with rotation of the roll set in such a way that sheet feed through the nip zone is effected for part of the time by the roll set 22, 23 and for part of the time by the second drive 60, from which the subject-matter of claim 1 differs in that the second drive imparts feed to the sheet material through drive transmitting means which freewheel while in engagement with the roll driven sheet.

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/GB00/01129

The problem to be solved by the present invention may therefore be regarded as how to prevent scuffing between the sheet material and the second drive when said sheet material is fed by the first drive.

The solution proposed in claim 1 of the present application cannot be considered as involving an inventive step (Article 33(3) PCT) for the following reasons.

These features have already been employed for the same purpose in a similar apparatus, see D2, column 1, lines 17 to 62 and column 2, line 18 to column 3, line 33, fig. 1: the second drive 32 disposed upstream of the nip zone 33, 34 for effecting feed of the sheet material 7 imparts feed to the sheet material 7 through drive transmitting means 26 which freewheel while in engagement with the roll 33, 34 driven sheet 7. It would be obvious to the person skilled in the art, namely when the same result is to be achieved, to apply these features with corresponding effect to an apparatus according to D1, thereby providing second drive 60 with drive transmitting means 26 and arriving at an apparatus according to claim 1. **The subject-matter of claim 1 does therefore not involve an inventive step (Article 33(3) PCT).**

Dependent claims 3-31 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of inventive step, the reasons being as follows:

- D1 discloses also the additional features of claims 3 (see respectively page 1, lines 19-22), 4-5 and 7 (page 2, lines 8-21; fig. 1, 2; page 3, lines 97-107), 13 (see page 4, lines 26-29); 14-15 (see page 2, lines 11-16), 16 (see page 3, line 120 to page 4, line 34), 18 (see page 1, lines 9-13).

- the subject matter of claim 6 differs from the combination of D1 and D2 in that the roll set is provided with a traction section trailing one of the tools for imparting feed motion to the sheet material subsequent to disengagement between said one tool and the sheet.

The problem to be solved by these additional features may also be regarded as how to improve the feeding of the sheet material after disengagement between said one tool and the sheet.

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/GB00/01129

However, these features have already been employed for the same purpose in a similar apparatus, see D3, page 2, line 105 to page 3, line 19, fig 1 and 2.

Moreover these additional features function in claim 6 in their normal way and do not produce any non-obvious working inter-relationship with the other features of claim 6 (see Guidelines C-IV Annex 2.1): indeed these features are functioning totally independently from the free-wheel means known from D2 since the traction section only imparts feed motion to the sheet material when this one is no longer fed by the second drive (see description, page 17, lines 1-7). Therefore it would be obvious to the person skilled in the art, namely when the same result is to be achieved, to apply these features with corresponding effect to an apparatus according to the combination of D1 and D2, thereby arriving at an apparatus according to claim 6. **The subject-matter of claim 6 does therefore not involve an inventive step (Article 33(3) PCT);**

- D2 also discloses the additional features of claim 8 (see column 1, line 63 to column 2, line 2), 9-10 (see fig. 1), 11-12 (see column 3, line 41 to column 4, line 24), 17 (see Fig. 1), 19-24, 26, 27, 29 (see fig. 1, column 2, line 18 to column 4, line 39).

The additional features of claim 25 respectively 28; 30, 31 have already been employed for the same purpose in a similar apparatus, see D4, column 2, lines 40-43, fig. 1 respectively D5, column 2, line 37 to column 3, line 49, fig. 1; D6, page 3, paragraph 3, fig. 1. Moreover these additional features function in claim 25 respectively 28; 30, 31 in their normal way and do not produce any non-obvious working inter-relationship with the other features of claims 25 respectively 28; 30, 31 (see Guidelines C-IV Annex 2.1). It would therefore be obvious to the person skilled in the art, namely when the same result is to be achieved, to apply these features with corresponding effect to an apparatus according to the combination of D1 and D2, thereby arriving at an apparatus according to claim 25 respectively 28; 30, 31. **The subject-matter of claim 25 respectively 28; 30, 31 does therefore not involve an inventive step (Article 33(3) PCT).**

Independent method claim 40 does not meet the requirements of the PCT in respect of inventive step (Article 33(3)) for reasons comparable to the ones

given with respect to claim 1.

Dependent method claims 42-47, 50 and 51 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of inventive step, the reasons being as follows:

- the additional feature of claim 42 i.e. supplying the sheet material to the nip in the form of discrete sheets is merely one of the two possibilities for supplying sheet material from which the skilled person would select, in accordance with circumstances, without the exercise of inventive skill, in order to ensure supplying of the sheet material;
- the additional features of claims 43-46 are disclosed by D1 (see page 1, lines 9-44 and page 3, line 97 to page 4, line 5);
- the additional features of claim 47 are disclosed by D2 (see column 4, lines 25-68);
- the subject-matter of claim 50 does not involve an inventive step (Article 33(3) PCT) for reasons comparable to the ones given with respect to claim 5;
- the subject-matter of claim 51 is disclosed by D1 in combination with D2.

Re Item VII

Certain defects in the international application

Reference is made to the following documents:

D1: GB 1 385 053 A,
D2: US 3 907 278 A.

Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in D1 and D2 is not mentioned in the description, nor are these documents identified therein.

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/GB00/01129

The independent claims are not written in the two-part form in accordance with Rule 6.3(b) PCT, with those features known in combination from D1 respectively D2 being placed in the preamble (Rule 6.3(b)(i) PCT) and with the remaining features being included in the characterising part (Rule 6.3(b)(ii) PCT).

The features of the claims are not provided with reference signs placed in parentheses (Rule 6.2(b) PCT).

CLAIMS

1. Apparatus for processing sheet material comprising;
a set of rotatable rolls provided with one or more sheet-processing tools for engagement with the sheet material in the nip zone between the roll set;
a first drive for rotating the roll set;
a second drive upstream of the nip zone for effecting feed of the sheet material; and
means operable to co-ordinate operation of the second drive with rotation of the roll set in such a way that sheet feed through the nip zone is effected for part of the time by the roll set and for part of the time by the second drive, the second drive imparting feed to the sheet material through drive transmitting means which freewheel while in engagement with the roll driven sheet.

2. Apparatus for processing sheet material comprising;
a set of rotatable rolls provided with one or more sheet-processing tools for engagement with the sheet material in the nip zone between the roll set;
a first drive for rotating the roll set;
a second drive upstream of the nip zone for effecting feed of the sheet material; and
means operable to co-ordinate operation of the second drive with rotation of the roll set in such a way that sheet feed through the nip zone is effected for part of the time by the roll set and for part of the time by the second drive.

3. Apparatus as claimed in Claim 1 or 2 in which the feed of sheet material through the nip zone is effected by the roll set at least while there is tool-sheet engagement.

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4. Apparatus as claimed in Claim 1, 2 or 3 in which feed of sheet material through the nip zone is effected by the second drive at least for part (preferably a major part) of the time that there is no tool-sheet engagement.
5. Apparatus as claimed in any one of Claims 1 to 4 in which the roll set is provided with two or more circumferentially spaced sheet-processing tools.
6. Apparatus as claimed in Claim 5 in which the roll set is provided with a traction section trailing one of the tools for imparting feed motion to the sheet material subsequent to disengagement between said one tool and the sheet.
7. Apparatus as claimed in any one of Claims 1 to 6 in which the second drive is a variable speed drive operable to vary the speed profile of sheet material feed through the nip zone.
8. Apparatus as claimed in Claim 1 or any one of Claims 3 to 7 when dependent on Claim 7 including means for braking or damping freewheeling of said drive transmitting means so that freewheeling is arrested substantially immediately upon disengagement of the sheet from the drive transmitting means.
9. Apparatus as claimed in Claim 1 or 8 in which the drive transmitting means comprises rollers which engage the sheet material.
10. Apparatus as claimed in Claim 1 or 8 in which the drive transmitting means includes one or more endless conveyor belts which engage the sheet material.

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11. Apparatus as claimed in any one of Claims 1, 8, 9 and 10 in which, during roll driven sheet material feed, the second drive is arrested or operates at a reduced drive speed compared with the roll drive speed.
12. Apparatus as claimed in any one of Claims 1 and 8 to 10 in which, during roll driven sheet material feed, the second drive is arrested or operates at a reduced drive speed compared with the roll drive speed and in which said drive transmitting means operates automatically in freewheel mode when engaged with sheet material being fed at a speed exceeding that of the second drive.
13. Apparatus as claimed in any one of Claims 1 to 12 in which, immediately prior to transfer of sheet material feed from the second drive to the roll set or *vice versa*, the second drive is programmed to run at a speed which is reduced compared with the roll speed.
14. Apparatus as claimed in any one of Claims 1 to 12 in which, during the interval leading up to transfer of sheet material feed from the second drive to the roll set or *vice versa*, the second drive operates in a mode in which its speed exceeds the roll speed and is then adjusted to a lower speed.
15. Apparatus as claimed in Claim 14 in which said lower speed is less than the roll speed.
16. Apparatus as claimed in any one of Claims 1 to 15 in which the co-ordinating means is programmable in dependence upon the configuration of tool operations to be performed on the sheet.

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17. Apparatus as claimed in any one of Claims 1 to 16 in which the sheet material is fed to the roll set as discrete blanks.

18. Apparatus as claimed in any one of Claims 1 to 16 in which the sheet material is fed to the roll set as a continuous web of material.

19. Apparatus as claimed in any one of Claims 1 to 7 in which the second drive comprises a feed table having a gate and upon which the sheets may be stacked against the gate which allows only the lowermost sheet to pass therebeneath, a bed of rollers within the surface of the table which may be rotatably driven to advance the lowermost sheet beneath the gate to the take-up mechanism, means to allow the rollers to free-wheel once the lowermost sheet is being advanced thereover by said take-up mechanism, and means for restraining freewheeling roller feed of the next lowermost sheet after the sheet being fed has passed under the gate.

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20. Apparatus as claimed in any one of Claims 1 to 7 in which the second drive comprises a feed table having a gate and upon which the sheets may be stacked against the gate which allows only the lowermost sheet to pass therebeneath, a bed of rollers within the surface of the table which may be rotatably driven to advance the lowermost sheet beneath the gate to the take-up mechanism, means to allow the rollers to free-wheel once the lowermost sheet is being advanced thereover by said take-up mechanism, and means for restraining freewheeling roller feed of the next lowermost sheet after the sheet being fed has cleared the rollers.

25 21. Apparatus as claimed in any one of Claims 1 to 7 in which the second drive comprises a feed surface having a gate and upon which the sheets may be stacked against the gate which allows only the lowermost sheet to pass therebeneath, conveyor means associated with the feed surface for advancing the lowermost sheet beneath the

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gate to the take-up mechanism, means to allow the conveyor means to free-wheel once the lowermost sheet is being advanced thereover by said take-up mechanism, and means for restraining freewheeling feed of the next lowermost sheet after the sheet being fed has cleared the conveyor means.

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22. Apparatus as claimed in Claim 21 in which the conveyor means comprises roller means which directly engage with the lowermost sheet.

10 23. Apparatus as claimed in Claim 21 in which the conveyor means comprises roller means which contact the lowermost sheet indirectly through one or more conveyor belts entrained around the roller means.

24. Apparatus as claimed in any one of Claims 19 to 23 in which the restraining means comprises brake means acting on the rollers or conveyor means.

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25. Apparatus as claimed in any one of Claims 19 to 23 in which the restraining means comprises vacuum suction means located upstream of the rollers or conveyor means to hold the next lowermost sheet against the action of the freewheeling rollers after the sheet being fed has passed under the gate.

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26. Apparatus according to any one of Claims 19 to 25 in which the take-up mechanism comprises a tool-carrying roll set.

25 27. Apparatus according to any one of Claims 19 to 26 in which the rollers or conveyor means are fitted with sprag clutches and advance the sheet being fed at

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17. Apparatus as claimed in any one of Claims 1 to 16 in which the sheet material is fed to the roll set as discrete blanks.
18. Apparatus as claimed in any one of Claims 1 to 16 in which the sheet material is fed to the roll set as a continuous web of material.
19. Apparatus as claimed in any one of Claims 1 to 7 in which the second drive comprises a feed table having a gate and upon which the sheets may be stacked against the gate which allows only the lowermost sheet to pass therebeneath, a bed of rollers within the surface of the table which may be rotatably driven to advance the lowermost sheet beneath the gate to the take-up mechanism, means to allow the rollers to free-wheel once the lowermost sheet is being advanced thereover by said take-up mechanism, and means for restraining freewheeling roller feed of the next lowermost sheet after the sheet being fed has passed under the gate.
- 15
20. Apparatus as claimed in any one of Claims 1 to 7 in which the second drive comprises a feed table having a gate and upon which the sheets may be stacked against the gate which allows only the lowermost sheet to pass therebeneath, a bed of rollers within the surface of the table which may be rotatably driven to advance the lowermost sheet beneath the gate to the take-up mechanism, means to allow the rollers to free-wheel once the lowermost sheet is being advanced thereover by said take-up mechanism, and means for restraining freewheeling roller feed of the next lowermost sheet after the sheet being fed has cleared the rollers.
- 20
21. Apparatus as claimed in any one of Claims 1 to 7 in which the second drive comprises a feed surface having a gate and upon which the sheets may be stacked against the gate which allows only the lowermost sheet to pass therebeneath, conveyor means associated with the feed surface for advancing the lowermost sheet beneath the

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gate to the take-up mechanism, means to allow the conveyor means to free-wheel once the lowermost sheet is being advanced thereover by said take-up mechanism, and means for restraining freewheeling feed of the next lowermost sheet after the sheet being fed has cleared the conveyor means.

5

22. Apparatus as claimed in Claim 21 in which the conveyor means comprises roller means which directly engage with the lowermost sheet.

10 23. Apparatus as claimed in Claim 21 in which the conveyor means comprises roller means which contact the lowermost sheet indirectly through one or more conveyor belts entrained around the roller means.

15 24. Apparatus as claimed in any one of Claims 19 to 23 in which the

restraining means comprises brake means acting on the rollers or conveyor means.

20 25. Apparatus as claimed in any one of Claims 19 to 23 in which the
restraining means comprises vacuum suction means located upstream of the rollers or
conveyor means to hold the next lowermost sheet against the action of the freewheeling
rollers after the sheet being fed has passed under the gate.

26

26. Apparatus according to any one of Claims 19 to 25 in which the take-up
mechanism comprises a tool-carrying roll set. —

25 27. Apparatus according to any one of Claims 19 to 26 in which the rollers or
conveyor means are fitted with sprag clutches and advance the sheet being fed at

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substantially the same speed as, or a slower speed than that of, the take-up mechanism.

28. Apparatus according to any one of Claims 19 to 28 in which the rollers or conveyor means are driven by a servo electric motor which alternately drives the rollers or conveyor means forwardly and stops, the timing of the motor being controlled by the processing machinery.
29. Apparatus according to any one of Claims 19 to 28 wherein vacuum suction is applied from beneath the rollers or conveyor means to pull the lowermost sheet downwardly against the rollers.
30. Apparatus according to Claim 19 or 20 wherein the rollers are rotatably interconnected by timing drive belt means, one of which rollers is driven by a further timing drive belt.
31. Apparatus according to Claim 30 wherein said further drive belt is toothed.
32. Apparatus for feeding sheet material sequentially on demand to take-up mechanism of sheet processing machinery, said apparatus comprising a feed table having a gate and upon which sheets may be stacked against the gate which allows only the lowermost sheet to pass therebeneath, drive transmitting means driven by a servo-motor to advance the lowermost sheet beneath the gate to the take-up mechanism, a sensing means between the gate and the take-up mechanism to detect the passage of a datum position of the sheet, a microprocessor which receives data indicating the position of the take-up mechanism and from the sensing means and programmed to control the servo-motor to ensure that the sheet presents itself to the take-up mechanism at the correct instant.

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33. Apparatus for feeding sheet material sequentially on demand to take-up mechanism of sheet processing machinery, said apparatus comprising a servo-drive motor, means for transmitting drive from the servo-drive motor to the sheet material to advance the sheet material to the take-up mechanism, sensing means for detecting the passage of a datum position of the sheet material as the latter advances towards the take-up mechanism, and a microprocessor which receives data indicating the position of the take-up mechanism and from the sensing means and programmed to control the servo-drive motor to secure registration between the sheet material and the take-up mechanism, the drive transmitting means being operable automatically in a freewheel mode while in engagement with sheet material travelling at a speed greater than the speed of the servo-drive motor.

34. Apparatus according to claim 32 or 33 wherein the microprocessor is programmed to ensure that the leading edge of the sheet presents itself to the take-up mechanism at a desired speed.

35. Apparatus according to claim 34 wherein the desired speed is slightly less than the speed at which the take-up mechanism forwards the sheet.

36. Apparatus according to claim 34 wherein the desired speed is zero.

37. Apparatus according to any one of Claims 32 to 36 wherein the take-up mechanism comprises a pair of take-up rolls. —

38. Apparatus according to any one of Claims 32 to 36 wherein the take-up mechanism comprises gripper bars.

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39. Apparatus according to any one of Claims 1, 8 to 10 and 32 to 38 wherein the means driven by the second drive or the servo-motor comprises a bed of rollers within the surface of the table which are rotatably driven to advance the lowermost sheet beneath the gate to the take-up mechanism when forward drive to the rollers is arrested and means to allow the rollers to free-wheel once the lowermost sheet is being advanced thereover by the roll set or take-up mechanism.

40. A method of treating sheet material by passage through the nip between a set of rotatable rolls provided with a least one sheet treatment tool, comprising: driving the sheet material through the nip for part of the time by means of the rolls and for part of the time by a separate servo-controlled drive which acts on the sheet material at a location upstream of the nip, the servo-controlled drive being transmitted to the sheet through roller means or conveyor belt means capable of freewheeling while in contact with the roll set-driven sheet material.

41. A method of treating sheet material by passage through the nip between a set of rotatable rolls provided with a least one sheet treatment tool, comprising: driving the sheet material through the nip for part of the time by means of the rolls and for part of the time by a separate servo-controlled drive which acts on the sheet material at a location upstream of the nip.

42. A method as claimed in Claim 40 or 41 including supplying the sheet material to the nip in the form of discrete sheets. —

43. A method as claimed in Claim 40 or 41 including supplying the sheet material to the nip in the form of a continuous web.

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44. A method as claimed in Claim 43 in which the continuous web is severed into discrete sheets by the rolls.
45. A method as claimed in Claim 42 or 44 in which the length of the discrete sheets exceeds the circumference of the tool-carrying roll.
46. A method as claimed in any one of Claims 40 to 45 in which, between successive tool-sheet operations on a given sheet or section of sheet material, the servo-controlled drive feeds a section of sheet through the nip of a length which differs from the circumferential spacing on the roll between the tool(s) effecting such operations.
47. A method as claimed in Claim 40 or any one of Claims 42 to 46 when dependent on Claim 40 including applying a braking force to the freewheeling roller means or conveyor belt means to prevent over run thereof.
48. A method as claimed in any one of Claims 40 to 47 including sensing the sheet position by detection of a datum position on the sheet and controlling sheet feed by the servo-controlled drive to secure at least initial registration between the sheet and the roll set tooling.
49. A method as claimed in any one of Claims 40 to 47 including sensing the sheet position by detection of a plurality of lengthwise spaced datum positions on the sheet and controlling sheet feed by the servo-controlled drive to secure and maintain registration between the sheet and the roll set tooling.

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50. A method as claimed in any one of Claims 40 to 49 including feeding a terminal trailing section of the sheet through the nip by means of a non-tool-carrying section of the roll set.
51. Sheet treated by the method claimed in any one of Claims 40 to 50.

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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

REC'D 19 JUN 2001

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(PCT Article 36 and Rule 70)

Applicant's or agent's file reference N00/0272/PCT	FOR FURTHER ACTION		See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. PCT/GB00/01129	International filing date (day/month/year) 24/03/2000	Priority date (day/month/year) 31/03/1999	
International Patent Classification (IPC) or national classification and IPC B65H5/34			
Applicant SULLIVAN, John Anthony			

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 11 sheets, including this cover sheet.

- This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 10 sheets.

3. This report contains indications relating to the following items:

- I Basis of the report
- II Priority
- III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV Lack of unity of invention
- V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI Certain documents cited
- VII Certain defects in the international application
- VIII Certain observations on the international application

Date of submission of the demand 18/09/2000	Date of completion of this report 13.06.2001
Name and mailing address of the international preliminary examining authority:  European Patent Office - Gitschner Str. 103 D-10958 Berlin Tel. +49 30 25901 - 0 Fax: +49 30 25901 - 840	Authorized officer David, P Telephone No. +49 30 25901 537



INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/GB00/01129

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):
Description, pages:

1-20 as originally filed

Claims, No.:

1-51 as received on 04/12/2000 with letter of 14/11/2000

Drawings, sheets:

1/5-5/5 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- the language of publication of the international application (under Rule 48.3(b)).
- the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- contained in the international application in written form.
- filed together with the international application in computer readable form.
- furnished subsequently to this Authority in written form.
- furnished subsequently to this Authority in computer readable form.
- The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- the description, pages:
- the claims, Nos.:

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/GB00/01129

- the drawings, sheets:
5. This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):
(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)
6. Additional observations, if necessary:

IV. Lack of unity of invention

1. In response to the invitation to restrict or pay additional fees the applicant has:
- restricted the claims.
- paid additional fees.
- paid additional fees under protest.
- neither restricted nor paid additional fees.
2. This Authority found that the requirement of unity of invention is not complied and chose, according to Rule 68.1, not to invite the applicant to restrict or pay additional fees.
3. This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2 and 13.3 is
- complied with.
- not complied with for the following reasons:
4. Consequently, the following parts of the international application were the subject of international preliminary examination in establishing this report:
- all parts.
- the parts relating to claims Nos. 1, 3-31, 40, 42-47, 50, 51.

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims 1, 3-18, 25, 28, 30, 31, 40, 42-47, 50, 51
	No: Claims 19-24, 26, 27, 29
Inventive step (IS)	Yes: Claims
	No: Claims 1, 3-31, 40, 42-47, 50, 51

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Industrial applicability (IA) Yes: Claims 1, 3- 31, 40, 42-47, 50, 51
No: Claims

**2. Citations and explanations
see separate sheet**

VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:
see separate sheet

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

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R Item IV

Lack of unity of invention

The international preliminary examination report has been established on the following group of claims: 1, 3-7 (when dependent on claim 1), 8-12, 13-18 (when dependent on claim 1), 19-31, 40, 42-46 (when dependent on claim 40), 47, 50-51 (when dependent on claim 40).

Re Item V

Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

Reference is made to the following documents:

D1: GB 1 385 053 A,

D2: US 3 907 278 A,

D3 : GB 756 357 A,

D4 : US 4 648 587 A,

D5 : EP 0 379 306 A,

D6 : WO 96 29269 A.

D1, which is considered to represent the most relevant state of the art for claim 1 discloses (cf. page 1, line 1 to page 4, line 34; Fig. 1-4) an apparatus for processing sheet material comprising;
a set of rotatable rolls 22, 23 provided with sheet-processing tools for engagement with the sheet material in the nip zone between the roll set;
a first drive 61 for rotating the roll set;
a second drive 60 upstream of the nip zone for effecting feed of the sheet material;
and
means 62-68 operable to co-ordinate operation of the second drive 60 with rotation of the roll set in such a way that sheet feed through the nip zone is effected for part of the time by the roll set 22, 23 and for part of the time by the second drive 60, from which the subject-matter of claim 1 differs in that the second drive imparts feed to the sheet material through drive transmitting means which freewheel while in engagement with the roll driven sheet.

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The problem to be solved by the present invention may therefore be regarded as how to prevent scuffing between the sheet material and the second drive when said sheet material is fed by the first drive.

The solution proposed in claim 1 of the present application cannot be considered as involving an inventive step (Article 33(3) PCT) for the following reasons.

These features have already been employed for the same purpose in a similar apparatus, see D2, column 1, lines 17 to 62 and column 2, line 18 to column 3, line 33, fig. 1. It would be obvious to the person skilled in the art, namely when the same result is to be achieved, to apply these features with corresponding effect to an apparatus according to D1, thereby arriving at an apparatus according to claim 1. **The subject-matter of claim 1 does therefore not involve an inventive step (Article 33(3) PCT).**

Dependent claims 3-18 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of inventive step, the reasons being as follows:

- D1 discloses also the additional features of claims 3 (see respectively page 1, lines 19-22), 4-5 and 7 (page 2, lines 8-21; fig. 1, 2; page 3, lines 97-107), 13 (see page 4, lines 26-29); 14-15 (see page 2, lines 11-16), 16 (see page 3, line 120 to page 4, line 34), 18 (see page 1, lines 9-13).

- the subject matter of claim 6 differs from the combination of D1 and D2 in that the roll set is provided with a traction section trailing one of the tools for imparting feed motion to the sheet material subsequent to disengagement between said one tool and the sheet.

The problem to be solved by these additional features may also be regarded as how to improve the feeding of the sheet material after disengagement between said one tool and the sheet.

However, these features have already been employed for the same purpose in a similar apparatus, see D3, page 2, line 105 to page 3, line 19, fig 1 and 2.

Moreover these additional features function in claim 6 in their normal way and do not produce any non-obvious working inter-relationship with the other features of

claim 6 (see Guidelines C-IV Annex 2.1). Indeed these features are functioning totally independently from the free-wheel means known from D2 since the traction section only imparts feed motion to the sheet material when this one is no longer fed by the second drive (see description, page 17, lines 1-7). Therefore it would be obvious to the person skilled in the art, namely when the same result is to be achieved, to apply these features with corresponding effect to an apparatus according to the combination of D1 and D2, thereby arriving at an apparatus according to claim 6. **The subject-matter of claim 6 does therefore not involve an inventive step (Article 33(3) PCT);**

- D2 also discloses the additional features of claim 8 (see column 1, line 63 to column 2, line 2), 9-10 (see fig. 1), 11-12 (see column 3, line 41 to column 4, line 24), 17 (see Fig. 1).

D2, which is considered to represent the most relevant state of the art for claims 19- 21 discloses (see fig. 1, column 2, line 18 to column 4, line 39) an apparatus for feeding sheet material 7 sequentially on demand to take up mechanism 33, 34 of sheet processing machinery, said apparatus comprising a feed table having a gate 9 and upon which the sheets 7 may be stacked against the gate 9 which allows only the lowermost sheet to pass there beneath, a bed of rollers 8 within the surface of the table which may be rotatably driven to advance the lowermost sheet beneath the gate 9 to the take-up mechanism 33, 34, means 26 to allow the rollers 8 to freewheel once the lowermost sheet is being advanced thereover by said take-up mechanism 33, 34, and means for restraining freewheeling roller feed of the next lowermost sheet after the sheet 7 being fed has passed under the gate 9.

The subject-matter of independent claim 19 does therefore not meet the requirements of the PCT in respect of novelty (Article 33(2) PCT).

D2 discloses also (see fig. 1, column 2, line 18 to column 4, line 39) an apparatus for feeding sheet material 7 sequentially on demand to take up mechanism 33, 34 of sheet processing machinery, said apparatus comprising a feed table having a gate 9 and upon which the sheets 7 may be stacked against the gate 9 which

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allows only the lowermost sheet 7 to pass there beneath, a bed of rollers 8 within the surface of the table which may be rotatably driven to advance the lowermost sheet 7 beneath the gate 9 to the take-up mechanism 33, 34, means 26 to allow the rollers to freewheel once the lowermost sheet 7 is being advanced thereover by said take-up mechanism 33, 34, and means for restraining freewheeling roller feed of the next lowermost sheet 7 after the sheet being fed has cleared the rollers 8.

The subject-matter of independent claim 20 does therefore not meet the requirements of the PCT in respect of novelty (Article 33(2) PCT).

D2 discloses also (see fig. 1, column 2, line 18 to column 4, line 39) an apparatus for feeding sheet material 7 sequentially on demand to take up mechanism 33, 34 of sheet processing machinery, said apparatus comprising a feed surface having a gate 9 and upon which the sheets 7 may be stacked against the gate 9 which allows only the lowermost sheet 7 to pass there beneath, conveyor means 1 associated with the feed surface for advancing the lowermost sheet 7 beneath the gate 9 to the take-up mechanism 33, 34, means 26 to allow the conveyor means 1 to free-wheel once the lowermost sheet 7 is being advanced thereover by said take-up mechanism 33, 34, and means for restraining freewheeling feed of the next lowermost sheet 7 after the sheet being fed has cleared the conveyor means 1.

The subject-matter of independent claim 21 does therefore not meet the requirements of the PCT in respect of novelty (Article 33(2) PCT).

Dependent claims 22-31 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of novelty and/or inventive step, the reasons being as follows:

D2 discloses also (see fig. 1, column 2, line 18 to column 4, line 39) the additional features of dependent claims 22-24, 26, 27, 29.

The additional features of claim 25 have already been employed for the same

purpose in a similar apparatus, see D4, column 2, lines 40-43, fig. 1. It would be obvious to the person skilled in the art, namely when the same result is to be achieved, to apply these features with corresponding effect to an apparatus according to D2, thereby arriving at an apparatus according to claim 25. **The subject-matter of claim 25 does therefore not involve an inventive step (Article 33(3) PCT).**

The additional features of claim 28 have already been employed for the same purpose in a similar apparatus, see D5, column 2, line 37 to column 3, line 49, fig. 1. It would be obvious to the person skilled in the art, namely when the same result is to be achieved, to apply these features with corresponding effect to an apparatus according to D2, thereby arriving at an apparatus according to claim 28. **The subject-matter of claim 28 does therefore not involve an inventive step (Article 33(3) PCT).**

The additional features of claim 30 respectively 31 have already been employed for the same purpose in a similar apparatus, see D6, page 3, paragraph 3, fig. 1. It would be obvious to the person skilled in the art, namely when the same result is to be achieved, to apply these features with corresponding effect to an apparatus according to D2, thereby arriving at an apparatus according to claim 30 respectively 31. **The subject-matter of claim 30 respectively 31 does therefore not involve an inventive step (Article 33(3) PCT).**

Independent method claim 40 does not meet the requirements of the PCT in respect of inventive step (Article 33(3)) for reasons comparable to the ones given with respect to claim 1.

Dependent method claims 42-47, 50 and 51 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of novelty and/or inventive step, the reasons being as follows:

-the additional feature of claim 42 i.e. supplying the sheet material to the nip in the form of discrete sheets is merely one of the two possibilities for supplying sheet material from which the skilled person would select, in accordance with

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circumstances, without the exercise of inventive skill, in order to ensure supplying of the sheet material;

- the additional features of claims 43-46 are disclosed by D1 (see page 1, lines 9-44 and page 3, line 97 to page 4, line 5);

- the additional features of claim 47 are disclosed by D2 (see column 4, lines 25-68);

-the subject-matter of claim 50 does not involve an inventive step (Article 33(3) PCT) for reasons comparable to the ones given with respect to claim 5;

-the subject-matter of claim 51 is disclosed by D1 in combination with D2.

Re Item VII

Certain defects in the international application

Reference is made to the following documents:

D1: GB 1 385 053 A,

D2: US 3 907 278 A.

Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in D1 and D2 is not mentioned in the description, nor are these documents identified therein.

The independent claims are not written in the two-part form in accordance with Rule 6.3(b) PCT, with those features known in combination from D1 respectively D2 being placed in the preamble (Rule 6.3(b)(i) PCT) and with the remaining features being included in the characterising part (Rule 6.3(b)(ii) PCT).

The features of the claims are not provided with reference signs placed in parentheses (Rule 6.2(b) PCT).

Re Item VIII

Certain observations on the international application

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Although claims 19, 20, 21 have been drafted as separate independent claims, they appear to relate effectively to the same subject-matter and to differ from each other only with regard to the definition of the subject-matter for which protection is sought or in respect of the terminology used for the features of that subject-matter. The aforementioned claims therefore lack conciseness. Moreover, lack of clarity of the claims as a whole arises, since the plurality of independent claims makes it difficult, if not impossible, to determine the matter for which protection is sought, and places an undue burden on others seeking to establish the extent of the protection.

Hence, claims 19, 20, 21 do not meet the requirements of Article 6 PCT.